

DEPARTMENT OF TRANSPORTATION**DIVISION OF ENGINEERING SERVICES**

Office of Structural Materials

Quality Assurance and Source Inspection



Bay Area Branch
690 Walnut Ave. St. 150
Vallejo, CA 94592-1133
(707) 649-5453
(707) 649-5493

Contract #: 04-0120F4Cty: SF/ALA Rte: 80 PM: 13.2/13.9File #: 70.28**WELDING INSPECTION REPORT****Resident Engineer:** Pursell, Gary**Address:** 333 Burma Road**City:** Oakland, CA 94607**Report No:** WIR-002719**Date Inspected:** 29-May-2008**Project Name:** SAS Superstructure**OSM Arrival Time:** 800**Prime Contractor:** American Bridge/Fluor Enterprises, a JV**OSM Departure Time:** 1830**Contractor:** Japan Steel Works**Location:** Muroran, Japan**CWI Name:** Mr. Makhmud Ashadi**CWI Present:** Yes No**Inspected CWI report:** Yes No N/A**Rod Oven in Use:** Yes No N/A**Electrode to specification:** Yes No N/A**Weld Procedures Followed:** Yes No N/A**Qualified Welders:** Yes No N/A**Verified Joint Fit-up:** Yes No N/A**Approved Drawings:** Yes No N/A**Approved WPS:** Yes No N/A**Delayed / Cancelled:** Yes No N/A**Bridge No:** 34-0006**Component:** Tower, Jacking and Deviation Saddles**Summary of Items Observed:**

The following report is based on METS observations at Japan Steel Works (JSW) in Muroran Japan. Current work: Casting, machining and nondestructive testing of Saddles.

Fabrication Building number 4

On this date the Caltrans Quality Assurance (QA) inspector, Joe Lanz arrived at JSW fabrication shop number 4 and observed the in process welding operation of the structural steel plates for the West Deviation Saddle base W2E1 end plates 1-4 and 1-17 to base plate 1-1. The weld designations are E1Y-4L-1, E1Y-4L-2, E1Y-17L-1 and E1Y-17L-2. The root welding was performed under the stem plate in between tack welds that had been welded and inspected visually and by magnetic particle examination previously. The JSW welding personnel T. Naitoh, identified as number 71-2736 and K. Kabayashi, identified as 08-5023 performed the welding utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ-3011-1. The welding was performed in the 2G (Horizontal) position. The filler metal utilized was identified as 4.8mm diameter, Class E9018-M-H4R, Brand name Hoballoy 9018-M. The preheating was performed by JSW fitter personnel K. Koanagi utilizing an oxygen fuel gas torch. The welding parameters and heat control were monitored by Intertek Testing Services Quality Control (QC) inspector Mr. Makhmud Ashadi at periodic intervals. The minimum preheat temperature of 160 degrees Celsius and maximum interpass temperature of 260 degrees Celsius was verified to meet the WPS requirements by Mr. Ashadi and the QA inspector utilizing Tempilstik temperature indicators. This data was entered into the QC inspector's daily log, identifying the location on a weld map. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 245 amps to 270 amps, 22 volts to 25 volts and travel

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speed of 132 to 168 mm per minute for the 4.8mm electrode by the QA inspector.

After the above partial root pass welds were completed, JSW welding personnel T. Naitoh, identified as number 71-2736 and K. Kabayashi, identified as 08-5023 began welding the root pass of West Deviation Saddle base W2E1 stem plate 1-2 to base plate 1-1, weld designation E1S-2L. The root welding was performed with one welder on each side of the stem plate utilizing the same welding procedure specification noted above. The work was not completed on this date and appears to meet the minimum requirements of the welding procedure specification and contract documents.

The QA inspector periodically observed The Nikko Inspection Services QC/NDT technician Mr. Rikuo Kumagai perform magnetic particle (MT) testing of West Deviation Saddle base W2E1, at locations where the root weld was completed as noted above. Each section of root weld between two tack welds was tested immediately upon completion to allow welding of the first fill pass. The MT was performed in accordance with ASTM standard E709, using the yoke method. The yoke utilized appeared to be model UM 3BF, serial numbers 93-01. The yoke dead lift was verified with a 4.65kg test plate. The magnetic field was verified with a field indicating gauge (pie gauge). Dry visible magnetic particle was utilized with high temperature magnetic particles. All calibrations appear to meet the minimum requirements of ASTM E709. The testing was evaluated in accordance with the contract special provisions. No relevant indications were marked by Mr. Kumagai. The testing was not completed on this date and the work appears to meet the minimum requirements of the contract specifications.

On this date the Caltrans Quality Assurance (QA) inspector, Joe Lanz observed the in process assembly fit-up operation of the structural steel plates for the West Deviation Saddle base W2E2. The JSW fitter personnel Kiyotaka Koanagi continued assembly of the West Deviation Saddle base W2E2 by aligning the rib plates, piece marks 2-9 and 2-10 on the base plate, joint designations E2Y-9L and E2Y-10L and aligning with the stem plate, joint designations E2Y-9V and E2Y-10V. The JSW welding personnel Yoshihiro Ohta, identified as number 08-2017 performed the in process tack welding utilizing the Shielded Metal Arc Welding (SMAW) process per the welding procedure specification (WPS) SJ-3011-2, SJ-3011-3. The welding was performed in the 2G (Horizontal) and 3G (Vertical) positions. The filler metal utilized was identified as 4.0mm and 4.8mm diameter, Class E9018-M-H4R, Brand name Hoballoy 9018-M. The welding parameters and heat control were monitored by Intertek Testing Services Quality Control (QC) inspector Mr. Makhmud Ashadi at periodic intervals. The minimum preheat temperature of 160 degrees Celsius and maximum interpass temperature of 260 degrees Celsius was verified to meet the WPS requirements by Mr. Ashadi and the QA inspector utilizing Tempilstik temperature indicators. This data was entered into the QC inspector's daily log, identifying the location on a weld map. The SMAW welding average amperage and voltage by clamp type meter and travel speed were verified to be within the welding procedure specification parameter range of 245 amps to 270 amps, 22 volts to 25 volts and travel speed of 132 to 168 mm per minute for the 4.8mm electrode and 145 amps to 165 amps, 21 volts to 24 volts and travel speed of 72 to 97 mm per minute for the 4.0mm electrode by the QA inspector. The work was not completed on this date and appears to meet the minimum requirements of the welding procedure specification and contract documents.

Test Facility

On this date the QA representative Joe Lanz arrived at Japan Steel Works (JSW) of Muroran Japan Test Facility to witness mechanical tests of Performance Qualification weld test plate ID SW7-2 in accordance with the contract documents. The testing was supervised by JSW QC personnel, Mr. Hideo Domon.

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The QA inspector observed Charpy V-notch tests for test plates SW7-2 in accordance with AWS D1.5-2002 paragraph 5.18.5 and the contract special provisions section - Fabrication of Welded Cast Components. The JSW QC personnel Mr. Naoya Takahashi verified the specimen dimensions with a Nikon Profile projector, calibration was verified to be due 12-26-2009. The JSW QC personnel Mr. Taiki Ube performed the tests using the test machine, Impact tester JTT-1173, calibration was verified to be due 11-22-2008. The Weld metal test specimens taken at 12.5mm from the surface were tested at -20 degrees Centigrade in accordance with AWS D1.5-2002 Table 4.1. The tests were performed and results recorded as follows.

Sample C21, 315J absorbed energy and 1.92mm lateral expansion, C22, 168J absorbed energy and 2.05mm lateral expansion, C23, 162J absorbed energy and 1.72mm lateral expansion, C24, 268J absorbed energy and 2.20mm lateral expansion, C25, 124J absorbed energy and 1.73mm lateral expansion for an average absorbed energy of 199J.

The Heat Affected Zone test specimens taken at 12.5mm from the surface on the cast material side were tested at 0 degrees Centigrade. The tests were performed and results recorded as follows.

Sample C31, 123J absorbed energy and 1.68mm lateral expansion, C32, 122J absorbed energy and 1.68mm lateral expansion, C33, 168J absorbed energy and 1.66mm lateral expansion, C34, 133J absorbed energy and 1.79mm lateral expansion, C35, 155J absorbed energy and 2.69mm lateral expansion for an average absorbed energy of 126J.

The Heat Affected Zone test specimens taken at 12.5mm from the surface on the grade 345T material side were tested at -4 degrees Centigrade. The tests were performed and results recorded as follows.

Sample C11, 127J absorbed energy and 1.82mm lateral expansion, C12, 115J absorbed energy and 1.70mm lateral expansion, C13, 88J absorbed energy and 1.29mm lateral expansion, C14, 109J absorbed energy and 1.41mm lateral expansion, C15, 48J absorbed energy and 0.80mm lateral expansion for an average absorbed energy of 104J.

The QA inspector observed the All Weld Metal Tensile tests for test plate SW7-2 performed in accordance with AWS D1.5-2002 paragraph 5.18.4. The test machine, Shimazu, 300kn model, serial number I22104400055, calibration was verified to be due 05-31-2008. The JSW QC personnel Mr. Toshihiro Takayama verified the specimen dimensions and the testing was performed and results recorded as follows.

Sample B2-1, 462MPa yield, 590MPa tensile and 29.4% elongation. The samples were found acceptable in accordance with paragraph 5.19.4.

The QA inspector observed two Reduced Section Tensile tests for test plates SW5-1 and SW5-2 in accordance with AWS D1.5-2002 Section 5.18.1. The test machine Shimazu 1000kn model, serial number I22104400055 calibration was verified to be due 05-31-2008. JSW QC personnel Mr. Naoya Takahashi verified the specimen dimensions and the testing was performed and results recorded as follows.

Sample B1-1, 551MPa tensile, failure was in the base metal, sample B1-2, 552MPa tensile, failure was in the base metal. The samples were found acceptable in accordance with paragraph 5.19.1.

The QA inspector observed four each Side Bend tests for test plate SW7-2 in accordance with AWS D1.5-2002 paragraph 5.18.3. JSW QC personnel Mr. Naoya Takahashi performed tests and recorded results as acceptable in accordance with paragraph 5.19.2.

The QA inspector observed three each Macroetch samples for test plate SW7-2 which had been etched in accordance with AWS D1.5-2002 paragraph 5.18.2. The samples were found to be acceptable in accordance with

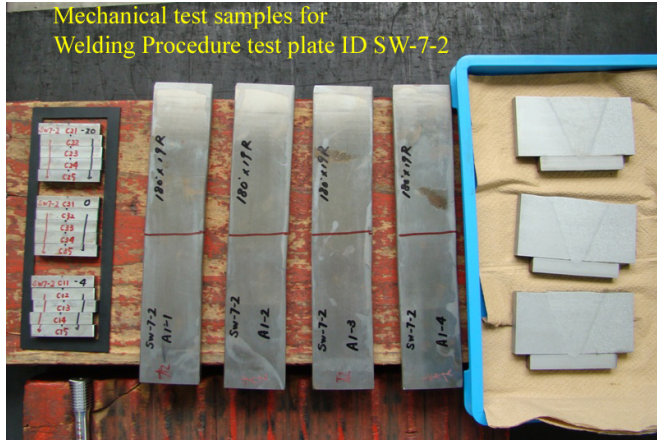
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paragraph 5.19.3.

Caltrans witness lot number B31-036-08 was assigned to test plate SW7-2 for tracking purposes.

The following digital photographs illustrate observations of the activities being performed.



Item	Weld Identification	Applicable WPS	CWI Name	Amperage	Voltage	TravelSpeed	Preheat Temp	Remarks
1	W2E1, E1Y-4L1 & 2	SJ-3011-1	Makhmud Ashadi	255 AC	24AC	140mm/min	170 C	K. Kabayashi
2	W2E1, E1Y-17L1 & 2	SJ-3011-1	Makhmud Ashadi	250AC	24AC	140mm/min	170 C	T. Naitoh
3	W2E2, E2Y-10L	SJ-3011-2	Makhmud Ashadi	255AC	24.5AC	150mm/min	170 C	Y Ohta
4	W2E2, E2Y-10V	SJ-3011-3	Makhmud Ashadi	145 AC	22.5AC	70mm/min	170C	Y Ohta

Summary of Conversations:

There were general conversations with Japan Steel Works, Ltd. representative Mr. Kunio Nagaya and Intertek Testing Services Certified Welding Inspectors Mr. Makhmud Ashadi relative to the location of the welding and inspection personnel in the fabrication shop number 4.

Comments

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Venkatesh Iyer, (858) 967-6363, who represents the Office of Structural Materials for your project.

Inspected By:	Lanz,Joe	Quality Assurance Inspector
Reviewed By:	Brasel,Ron	QA Reviewer